FUSSELL, (M.H.)

HEART WITH THREE CAVITIES.

Partial Transposition of Abdominal Viscera.

BY

M. HOWARD FUSSELL, M.D.,

OF MANAYUNK, PHILADELPHIA.

FROM

THE MEDICAL NEWS,

November 3, 1888.

SURGEON GEN'L'S OFFICE
353
LIBRARY

[Reprinted from THE MEDICAL NEWS, November 3, 1888.]

HEART WITH THREE CAVITIES.

Partial Transposition of Abdominal Viscera.[1]

BY M. HOWARD FUSSELL, M.D.,
OF MANAYUNK, PHILADELPHIA.

LOUISA D., aged twenty-one months. Parents healthy; had one other child, which died of summer complaint, aged two months. Louisa was born September, 1886, after a very easy labor, weighed about five pounds, and was apparently perfectly healthy. No cyanosis except that common to infants immediately after birth. It nursed and rested well, and I left it at the end of two weeks, having no idea of its serious malformation.

At the age of three months the child was brought to me, with the statement that she continually "grunted," giving the impression to those around that her clothing was too tight. Her appearance was quite normal. On examination the "grunt" was found to resemble closely the expiratory moan of pneumonia. Respirations not markedly accelerated; pulse regular and not over-rapid. On auscul-

[1] Read before the Pathological Society of Philadelphia.

SURGEON GEN'L'S OFFICE
355
LIBRARY

tation an exceedingly loud double blowing murmur was heard, with greatest intensity in the mitral region, but conducted equally over the entire area of both chests. The heart was not markedly hypertrophied. It was impossible to decide whether the murmur had its origin at the tricuspid or mitral valves. There was no cyanosis and no œdema.

Thinking the moan came possibly from the overburdened heart, the little patient was put on half drop doses of tincture of digitalis, with the result of stopping the moan for several months.

During the spring and summer following the patient had many attacks of bronchitis and diarrhœa, but she grew fairly well and cut the usual number of teeth at the proper periods. She walked at twelve months. It was noticed now, however, that she began to fail in strength, and though she would take nothing but the breast it was thought best to wean her, and now began the real trouble. It was only by forcing that she would take milk, and she would eat nothing but sugar, clear starch, and dirt. She would eat ordinary starch by the handful, and whenever she could get near any earth eat it as so much sugar, and would cry lustily whenever she was taken away from the dirt. Gradually she ceased to walk, and finally would not stand alone. She was tempted by every imaginable thing, but would eat absolutely nothing but milk, sugar, starch, and dirt.

On December 12, 1887, I was called to see her on account of a bad cough. This at first promised to be one of her frequent attacks of bronchitis. However, her temperature rose to 103° F., pulse 160,

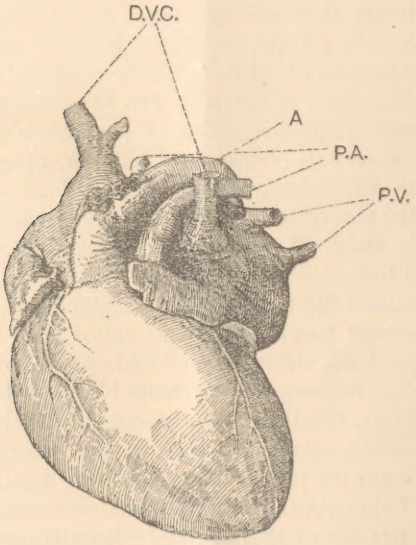
regular, and respirations 80 per minute. Consolidation of right base developed. There was characteristic blowing breathing over the whole lower right lobe. The child had pneumonia, and, contrary to my faintest hope, made a good recovery and appeared better than she had for a year; she even began to walk a little, and lost her desire for dirt and would eat very slightly of cracker, but still clung to her milk, sugar, and starch. Her heart had gradually grown. After her attack of pneumonia I find the following note: Præcardia bulging, apex beat beyond the nipple line; dulness from mid-sternum to beyond the nipple line. A loud double murmur over the whole chest. Liver dulness extends below the umbilical line.

The patient did well until the beginning of May of the present year, when I was called, and found her propped up, the subject of orthopnœa, countenance livid, finger-nails extremely blue, heart's action irregular, breathing labored and irregular, chest full of mucous râles, no œdema of the extremities. The child was the picture of one suffering from heart failure. I thought the end had certainly come; but under a free use of digitalis and nitroglycerine she became quite comfortable, and the cyanosis disappeared almost entirely for nearly two weeks, at the end of which time the right hand and foot began to swell gradually, general anasarca took place, and the patient gradually failed, dying with extreme suffering on June 18th.

Post-mortem thirty-six hours after death. Dr. George Dock, of Philadelphia, kindly made the sec-

tion. The child was small for the age of twenty-one months. There was œdema of the extremities and face, and the belly protruded by what proved to be ascitic fluid.

FIG. 1.



Anterior view of heart.

D. V. C. Descending vena cava (innominate veins).
A. Aorta.
P. A. Pulmonary artery.
P. V. Pulmonary veins.

Heart.—On opening the chest the heart was seen occupying almost the entire anterior portion of the chest. The auricle was greatly distended. The

ascending vena cava passed up on the left side of the spinal column and apparently entered the left auricle. After noting the anomaly, the heart and lungs were removed entire and dissected at leisure.

The entire heart was much hypertrophied. The auricles and right heart were in a state of extreme distention, giving a typical picture of heart failure. While in this distended condition the auricular portion was seen to be of much greater size than the ventricular portion, at least half as large again (Fig. 2). The right ventricular portion was much more developed than the left, the right ventricle evidently forming the apex (Fig. 1).

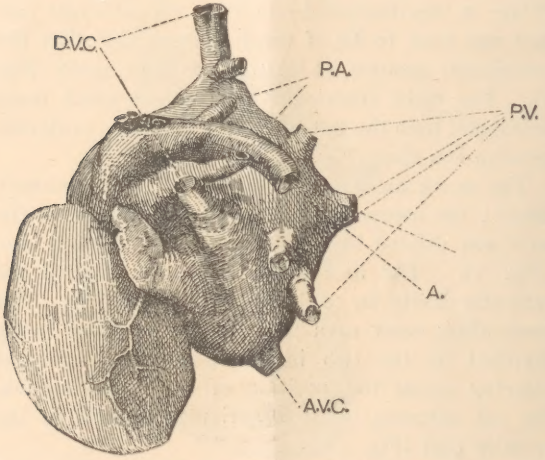
The aorta arose to the right of the pulmonary artery; the ascending and transverse portion of the arch was dilated to at least twice its original size (Fig. 1). The ascending vena cava entered the auricular cavity far to the left and posteriorly. The descending vena cava was absent, its place being supplied by the two innominate veins, the right entering about the position of the superior cava, the left entering the left auricular portion in the anterior part (Fig. 1).

The pulmonary veins were normal in position and number.

The heart was opened by making an incision in the pulmonary artery and following that vessel into the right ventricle. The wall of the ventricle was half an inch thick and filled with a moderately firm clot. Its cavity had three outlets, viz.: the aorta, the pulmonary artery, and the auriculo-ventricular orifice. The pulmonary orifice lay close to the sep-

tum to the left of the aorta, and was guarded by two healthy semilunar valves. It was much contracted by thickening of the ring, was of triangular shape, and of about the calibre of a crow-quill (Fig. 3).

FIG. 2.



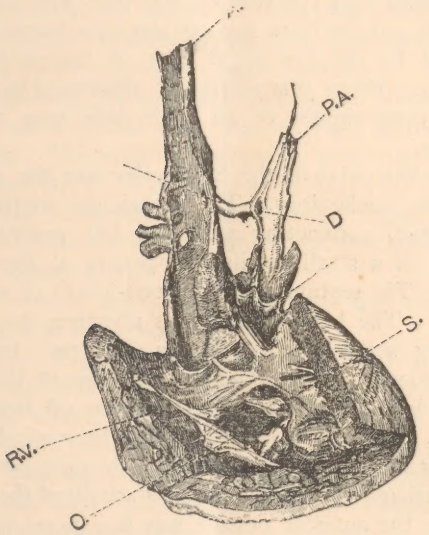
Left posterior view of heart.

D. V. C. Descending vena cava (innominate veins).
P. A. Pulmonary artery.
P. V. Pulmonary veins.
A. Aorta.
A. V. C. Ascending vena cava.

The aortic orifice was to the right of the pulmonary and would easily admit the tip of the little finger—it was protected by three valves (Fig. 3).

The auriculo-ventricular orifice was placed posteriorly to the above two. It admitted the tips of three

FIG. 3.



Interior of right ventricle.

A. Aorta.
P. A. Pulmonary artery.
D. Ductus arteriosus.
S. Edge of septum.
O. Auriculo-ventricular orifice.
R. V. Right ventricle.

fingers. The valves protecting this orifice were evidently incompetent. The right half of the ring was

protected by a large valve, which was attached to the apex by a papillary muscle. Posteriorly, and joined to the posterior edge of the above valve, is a nodular formation, evidently an attempt at a second valve. The remaining portion of the ring was perfectly smooth and free from any valvular attachment. It is formed by the free upper edge of the ventricular septum. From this portion of the ring a muscular band three-eighths of an inch wide runs to the septum.

The free edge of the large valve was the seat of nodular thickenings. The ventricular septum was imperfect, connecting with the left ventricle by means of a small semilunar opening at the upper edge. The septum was about one-fourth of an inch thick. The left ventricle was abortive, its cavity holding scarcely more than a drachm. Its walls were about half the thickness of those of the right ventricle. There was no vessel given off from this cavity, the only openings being the auriculo-ventricular and the small opening into the right ventricle. The auriculo-ventricular opening admitted the index finger; the anterior portion was free from valvular attachment and was formed by the free edge of the ventricular septum in common with the free portion of the ring on the other side. The remainder of the orifice was protected by a valve having its anterior attachment at a point in common with the anterior attachment of the valve on the right side and the posterior attachment in common with the abortive valve on the left; it was attached to the walls

by chordæ running to the papillary muscles, one on the anterior, the other on the posterior wall.

Another and perhaps the proper description is, that there is but *one* auriculo-ventricular orifice which is common to the right and left ventricles, and protected by valves as described above, the two ventricles communicating by a small semilunar opening in the upper part of the septum.

On opening the auricular portion, the septum was found wanting, and there was no trace of foramen or valve. The walls of the cavity were one-eighth of an inch thick. The capacity was sixty c. c. There were two complete auricular appendages. The common auriculo-ventricular orifice was well seen at the bottom of this cavity.

The ductus arteriosus arose from the left pulmonary artery and was patulous.

Lungs.—Right not fully divided into its three lobes, and there was an attempt at a fourth lobe. Left, the entire lower lobe was consolidated apparently by an infarct, but no embolus was found.

The *liver* was a typical nutmeg, almost round, of monstrous size, occupying half the abdominal cavity, exceedingly hard.

The *œsophagus* passed to the right of the spinal column, entering the cardiac end of the stomach in the right hypochondriac region.

The *spleen* consisted of three distinct portions curiously nodulated with an attempt at a fourth division. It lay attached to the stomach in the right hypochondrium.

The *stomach* was entirely on the right side under the right lobe of the liver, the pylorus lying in an almost

normal position, but pointing forward, and the cardiac end lay along the column posteriorly on the right side. The duodenum ran anteriorly.

Pancreas short and round, with the head pointing anteriorly; duct presumably opening into the ductus, commences about one inch from the pylorus.

Cæcum lay in right iliac region, but was anterior.

Colon ran half way up on right side, crossed the column, and lay in folds in the right iliac region.

The *kidneys* were cyanotic.

This is the fourth specimen of malformed heart presented to the Philadelphia Pathological Society, and the third of its class. The first was presented by Dr. Darrach, in 1858, and is reported in vol. i. of the *Transactions*. Save that the orifice of the pulmonary artery was entirely obliterated, it was a counterpart of this specimen. Dr. Rex presented a malformation in 1874, vol. v., which was doubtless of the same class, but the aorta was connected with both the right and left ventricles. Dr. Eskridge presented a specimen in 1883, but the malformation was almost exclusively in the right side, being an abnormal septum in the right auricle, the openings and vessels being normal.

Practically, the heart which I have described consists of two cavities, only the one ventricle and one auricle taking any active part in the circulation.

However, I think it must be classed with that more common form of malformations in which there is an attempt at the four cavities, arrest of development taking place at a later period of development.

When the arrest of development takes place very early there are only two cavities or perhaps three,

but almost universally there is but *one* vessel leading off from the common ventricle, arrest having taken place before the division of the primary artery.

In the class of which I think this forms one, there are two arteries, two auricular appendages, with a more or less complete formation of the septa of auricles and ventricles. The orifice of the pulmonary artery is always more or less contracted, sometimes, as in Darrach's case, entirely obliterated. The aorta may arise to the right of the pulmonary artery, as in this case, and always has connection with both ventricles, the septum ventriculorum being deflected usually to the left. Hunter supposed these defects were caused by some obstruction occurring in the pulmonary artery in early fœtal life, while the septum of the ventricle is incomplete, necessitating a flow of blood into the left ventricle, preventing a separation of the two ventricles, causing a deflection of the septum to the left and a dragging of the aorta to the right.

Meckel concludes that incompleteness and deflection of the septum are primitive defects, the blood finding a free outlet from the right ventricle through the aorta; the pulmonary artery becomes more or less abortive, and the orifice is contracted during the process of development.

Peacock believes that the defects are due partly to the arrest of development, by which the earlier position of the aorta is retained, and partly to obstruction of the pulmonary orifice and consequent distention of the right ventricle, causing the septum to be deflected to the left.

189 Green Lane, Manayunk.

THE MEDICAL NEWS.

A National Weekly Medical Periodical, containing 28-32 Double-Columed Quarto Pages of Reading Matter in Each Issue. $5.00 per annum, post-paid.

UNITING in itself the best characteristics of the magazine and the newspaper, THE MEDICAL NEWS renders a service of exceptional value to the profession. It presents original articles, hospital notes and clinical lectures by the ablest writers and teachers of the day, discusses living topics editorially in a clear and scholarly manner, and employs all the recent and approved methods of medical journalism—the telegraph, reporters and a corps of special correspondents covering all the medical centres of the globe. It thus imparts, without loss of time, all advances of knowledge attained in the medical sciences. In short, it is the effort of all concerned in the publication of THE NEWS that it shall be indispensable to every physician in active practice.

The American Journal of the Medical Sciences.

Edited by I. MINIS HAYS, A.M., M.D

Published monthly, beginning with 1888. Each number contains 112 octavo pages, amply illustrated. Price reduced to $4.00 per annum, post-paid.

In his contribution to *A Century of American Medicine*, published in 1876, Dr. John S. Billings, U. S. A., Librarian of the National Medical Library, Washington, thus graphically outlines the character and services of THE AMERICAN JOURNAL—"The ninety-seven volumes of this Journal need no eulogy. They contain many original papers of the highest value; nearly all the real criticisms and reviews which we possess; and such carefully prepared summaries of the progress of medical science, and abstracts and notices of foreign works, that from this file alone, were all other productions of the press for the last fifty years destroyed, it would be possible to reproduce the great majority of the real contributions of the world to medical science during that period."

COMMUTATION RATE.—Postage paid.

THE MEDICAL NEWS, published every Saturday,
THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, monthly, ... } in advance, $7.50.

LEA BROTHERS & CO., 706 & 708 Sansom St., Phila.